Attorney's Docket No.: 10830-054001 / A36-129092M/YS

$ AF 2800
#14/Appeal Brief
(D)Kmg
10/9/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Rikihiro Iida
Serial No. : 09/781,049
Filed : February 9, 2001
Title : DFB LASER DRIVING DEVICE, DFB LASER DRIVING METHOD AND STORAGE MEDIUM

Art Unit : 2828
Examiner : Cornelius H. Jackson

MAIL STOP AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

<u>BRIEF ON APPEAL</u>

(1) Real Party in Interest

The real party in interest is Ando Electric Co., Ltd, the assignee of record of the pending application.

(2) Related Appeals and Interferences

None.

(3) Status of Claims

Claims 1-3 stand rejected as anticipated by U.S. Patent No. 6,400,737 (Broutin et al.). (*See* final Office action of March 26, 2003 and Advisory Action of July 8, 2003)

(4) Status of Amendments

No amendments have been submitted following the mailing of the final Office action.

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

I hereby certify under 37 CFR §1.8(a) that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage on the date indicated below and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

September 25 2003
Date of Deposit

Kathryn Lugo
Signature

KATHRYN LUGO
Typed or Printed Name of Person Signing Certificate

(5) Summary of Invention

The invention relates to driving distributed feedback (DFB) lasers and can improve, in some cases, the ability to regulate to optical output level of a laser without shifting a set wavelength.

In one aspect, a device for driving a DFB laser (*e.g.*, DFB laser 1 in FIG. 1) includes an input unit to input set values of a wavelength and an output level. In the implementation of FIG. 1, for example, the input unit is illustrated as the interface 12. The laser driving device also includes an approximate temperature calculating section, an output level variation calculating section, an output level controlling section and a temperature controlling section. In the implementation of FIG. 1, each of those sections is incorporated in the central processing unit (CPU) 9.

The approximate temperature calculating section calculates an approximate temperature of the DFB laser based on the set values of the wavelength and the output level. As described, for example, in the specification in connection with the implementation of FIGS. 1 and 2, the CPU 9 collates the input set values of the wavelength and the optical output level with data stored in the storage 10 to calculate an approximate temperature of the DFB laser (page 13, line 22 – page 14, line 4).

The output level variation calculating section calculates an output level variation of the DFB laser based on the approximate temperature. The other sections of the device calculate, respectively, a value to control the output level of the DFB laser and a set temperature to control the temperature of the DFB laser.

The calculated output level may be provided, for example, to an output controlling digital/analog (D/A) converter 6 as shown in FIG. 1 to control the output level of the DFB laser. Similarly, the calculated temperature may be provided, for example, to a temperature controlling D/A converter 8 as shown in FIG. 1 to control the temperature of the DFB laser.

Although not recited in the claims, FIG. 1 also illustrates a thermistor 3 to monitor the temperature of the laser 1 and a peltier device 2 to cool the laser.

In related aspects, a method for driving a DFB laser and a storage medium storing a program for driving a DFB laser are also claimed.

(6) Issue

The sole issue presented is whether claims 1, 2 and 3 were properly rejected as anticipated under 35 U.S.C. 102(e) by U.S. Patent No. 6,400,737 (Broutin et al.).

(7) Grouping of Claims

Claims 1-3 stand or fall together.

(8) Argument

A finding of an anticipation requires that every limitation be disclosed in a single reference and that any limitation not so disclosed be "inherent" in the disclosure of that same reference. *Advanced Display Sys., Inc. v. Kent State Univ.,* 212 F.3d 1271 (Fed. Cir. 2000). That is simply not the case here. As discussed below, the Broutin et al. patent does not disclose (or suggest) at least the following claim limitation:

(i) "calculating an approximate temperature . . . based on the set values of the wavelength and output level."

The Broutin et al. patent discloses a control system with a temperature-tuned, wavelength stabilized laser module. The output of the laser can be modified by adjusting the temperature through thermo-electric cooler (TEC) 124. A thermistor 126 monitors the temperature of the laser and provides the measured temperature to the controller 160. A look-up table stores the correlation between the wavelengths and temperatures. The controller 160 calculates a TEC control signal (*e.g.*, a voltage) which is provided to ensure that the laser module 110 has a temperature corresponding to a desired wavelength.

The method of operation of the controller 160 is described beginning at col. 7, line 31:

> The method 200 begins when the controller 160 turns on the laser module 110 bias (step 202). . . . At step 204 the controller 160 inputs via an analog-to-digital converter 128 value or reading of the thermistor 126. This measured value is used to call and access a channel look-up table and is stored for future use in an etalon slope calculation.

The Broutin et al. patent discloses that the controller calculates the following values: (1) a normalized difference value according to equation 7 (col. 7, lines 52-63) , (2) a TEC control signal according to equation 6 (col. 8, lines 2-4 and col. 7, lines 1-4), (3) the etalon slope according to equation 2 (col. 8, lines 10-14 and col. 6, line 20) and (4) a numeric gain according to equation 5 (col. 8, lines 38-40 and col. 6, line 60).

There is, however, *no* disclosure (or suggestion) in the Broutin et al. patent of calculating a temperature, let alone "calculating an approximate temperature" as recited in the pending claims.

Moreover, the function of the thermistor 126 is to monitor the temperature of the module 110 (col. 4, lines 31-32), not to calculate a temperature. Indeed, applicant's specification also discloses a thermistor (item 3 in FIG. 1). However, whereas the CPU 9 in applicant's FIG. 1 calculates an approximate temperature, the thermistor 3 monitors an actual temperature. It is clear that monitoring a temperature is significantly different from calculating an approximate temperature as recited in the claims.

Therefore, there is simply no disclosure in the Broutin et al. patent of "calculating an approximate temperature . . ." as recited in the pending claims. That is sufficient to require reversal of the rejection of the claims as anticipated by the Broutin et al. patent.

In the following paragraphs, the applicant addresses additional statements in the final Office action and the Advisory Action.

1. The Office action (at page 5, par. c) refers to col. 6, line 6 – col. 7, line 5 of the Broutin et al. patent as allegedly disclosing calculating an approximate temperature "based on the set values of the wavelength and output level." That is incorrect. That section simply explains how the controller 160 relates the change in temperature monitored by the thermistor to an equivalent change in the TEC control signal (*see* col. 6, lines 35-36). It is clear that, according to the Brountin et al. patent, the actual temperature of the laser is obtained directly based on a measured value from the thermistor. The temperature of the laser (according to the Broutin et al. patent) is *not* calculated based on set values of the wavelength and the output level."

2. The Office action is incorrect when it states that (according to the Broutin et al. patent) "the information received by the thermistor is based on the set values of the wavelength and output level, since the set values of the wavelength and output level are what controls the laser temperature as well." (Emphasis added) As shown in FIG. 4, the "TEC control signal" is what controls the laser temperature. The TEC signal, which is simply a voltage signal (col. 6, line 34), is defined in equation (6) at col. 7, lines 1-4 of the Broutin et al. patent. Although the function of the TEC signal is "to ensure that the laser module 110 has a temperature corresponding to a desired wavelength" (col. 8, lines 47-50), the TEC signal does not constitute "set values" of wavelength and output level as recited in the claims.

3. The statement in the Office action that "Applicant failed to specify how the calculation is performed within the claim limitation" is irrelevant. The Office action does not reject the claims as indefinite, and there is ample support in the specification to satisfy the enablement requirement. There is no requirement that the claims specify a particular equation for calculating the approximate temperature.

4. The Office action also refers to the decision *Ex parte Masham* by the Board of Patent Appeals and Interferences for the proposition that claim language specifying the manner in which the apparatus is to be used does not constitute a patentable limitation. That decision is irrelevant because, according to claim 1, the approximate temperature calculating section is "adapted to calculate an approximate temperature of the DFB laser based on the set values of the wavelength and output level." That limitation constitutes a structural limitation, not merely an intended use of the apparatus. According to the specification, the approximate temperature calculating section may include, for example, a CPU. Recent decisions by the Federal Circuit have emphasized that a computer or microprocessor programmed to perform a particular function is different from a general purpose computer (*see, e.g., WMS Gaming*, Inc. *v. International Gaming Tech.*, 184 F.3d 1339 (Fed. Cir. 1999). Therefore, the approximate temperature calculating section, which is "adapted" to perform the specified functions, is more than a mere statement of purpose and may serve as a patentable limitation.

5. The Advisory Action states that the arguments submitted in response to the final Office action do not correspond to the invention as shown in figures 1 and 4. That is incorrect.

First, the Advisory Action apparently failed to note that figure 4 illustrates a "conventional" laser device, not the invention (*see* the Background section of the Specification).

Second, as noted in the Summary of Invention section above, the claimed features in claim 1, for example, do correspond to what is shown in FIG. 1 of applicant's specification. Specifically, the input unit is illustrated in FIG. 1 as the interface 12, and the approximate temperature calculating section, the output level variation calculating section, the output level controlling section and the temperature controlling section are incorporated in the central processing unit (CPU) 9 in the implementation of FIG. 1.

6. The Advisory action states that FIGS. 4 and 5 of the Broutin et al. patent show the temperature calculation in steps 204, 206, 210, 214, 216 and 218. That is incorrect.

FIG. 4 is simply a block diagram that shows the controller 160 receiving a <u>measured</u> temperature value from the thermistor 126 via the A/D converter 128. That drawing does not indicate that an approximate temperature is calculated.

Furthermore, FIG. 5 indicates only that the following parameters are "calculated":

(i) the etalon slope (steps 204 and 210);

(ii) normalized difference value according to equation 7 (steps 206, 216 and 218);

and

(iii) numeric gain value (step 214).

There is no disclosure (or suggestion) of <u>calculating</u> an approximate temperature value as recited in the claims.

Conclusion

In view of the foregoing remarks, applicant respectfully requests reversal of the rejections of the claims as anticipated.

The brief fee of $320 is enclosed. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 9/25/03

Samuel Borodach
Samuel Borodach
Reg. No. 38,388

Fish & Richardson P.C.
45 Rockefeller Plaza, Suite 2800
New York, New York 10111
Telephone: (212) 765-5070
Facsimile: (212) 258-2291

30160846.doc

Appendix of Claims

1. A DFB laser driving device for driving a DFB laser to output optical signals having a predetermined wavelength and a predetermined output level, the DFB laser driving device comprising:

an input unit adapted to input set values of a wavelength and an output level;

an approximate temperature calculating section adapted to calculate an approximate temperature of the DFB laser based on the set values of the wavelength and output level;

an output level variation calculating section adapted to calculate an output level variation of the DFB laser based on the approximate temperature;

an output level controlling section adapted to calculate a calculated value based on the output level variation and the set value of the output level, so as to control the output level of the DFB laser based on the calculated value; and

a temperature controlling unit adapted to calculate a set temperature of the DFB laser based on the calculated value and the set value of the wavelength so as to control the temperature of the DFB laser based on the set temperature of the DFB laser.

2. A method for driving a DFB laser to output optical signals having a predetermined wavelength and a predetermined output level, the method comprising:

inputting set values of a wavelength and a output level;

mathematical operation

calculating an approximate temperature of the DFB laser based on the set values of the wavelength and output level;

calculating an output level variation of the DFB laser based on the approximate temperature;

calculating a calculated value based on the output level variation and the set value of the output level;

controlling the output level of the DFB laser based on the calculated value;

calculating a set temperature of the DFB laser based on the calculated value and the set value of the wavelength; and

controlling the temperature of the DFB laser based on the set temperature.

3. An article comprising a storage medium storing therein a program, which can be executed by a computer, for driving a DFB laser to output optical signals having a predetermined wavelength and a predetermined output level, the program for causing the computer to:

input set values of a wavelength and a output level;

calculate an approximate temperature of the DFB laser based on the set values of the wavelength and output level;

calculate an output level variation of the DFB laser based on the approximate temperature;

calculate a calculated value based on the output level variation and the set value of the output level to obtain a calculated value;

control the output level of the DFB laser based on the calculated value;

calculate a set temperature of the DFB laser based on the calculated value and the set value of the wavelength; and

control the temperature of the DFB laser based on the set temperature.